

CLAIMS

What is claimed is:

Drawn as A resilient clip for use in securing a first member to a second member, the resilient clip comprising:

a flange portion having an aperture, the aperture adapted to receive a threaded fastener to couple the second member to the flange portion;

5 an insertion portion configured to be inserted into a hole formed into the first member, the insertion portion being coupled to the flange portion; and

a retaining portion coupled to the insertion portion and having first and second wing members, the first wing member being twisted about a first axis in a first direction, the second wing member being twisted about a second axis in the first direction, each of the first and second wing members terminating at a tip portion that is adapted to engage the first member.

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2. The resilient clip of Claim 1, wherein each of the tip portions is angled such that a portion of an associated one of the first and second wing members nearest a centerline of the aperture in the flange portion is longer than a portion of the associated one of the first and second wing members farthest from the centerline of the aperture in the flange portion.

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3. The resilient clip of Claim 2, wherein the tip portion is defined by an included angle of about 30° to about 80°.

4. The resilient clip of Claim 3, wherein the included angle of the tip portion is about 60°.

5. The resilient clip of Claim 2, wherein the tip portion has a flat edge for contacting the first member.

6. The resilient clip of Claim 2, wherein the tip portion has an edge for contacting the first member into which a plurality of teeth are formed.

7. The resilient clip of Claim 1, wherein each of the first and second wing members further includes a base portion that is fixedly coupled to the insertion portion, the first and second wing members being twisted such that their tip portions are twisted relative to their base portion by an angle of about 5° to about 45°.

8. The resilient clip of Claim 7, wherein the angle is about 30°.

9. The resilient clip of Claim 1, wherein the retaining portion includes first and second abutting flanges having a base that is spaced vertically apart from the first and second wing members, respectively, each of the bases of the first and second abutting flanges being configured to abut a surface of the first member opposite a surface into which the first and second wing members, respectively, are engaged.

10. The resilient clip of Claim 9, wherein the bases of the first and second abutting flanges are spaced apart from the flange portion.

11. The resilient clip of Claim 9, wherein the bases of the first and second abutting flanges and the flange portion are disposed within a common plane.

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12. The resilient clip of Claim 1, wherein the insertion portion is defined by a pair of flanges that are spaced apart about a central axis of the resilient clip, each of the flanges having a first portion, a second portion and a third portion, the first portion being coupled to the flange portion and tapering inwardly toward the central axis and downwardly from the flange portion, the second portion being coupled to an end of the first portion opposite the flange portion and extending downwardly therefrom generally parallel the central axis, the third portion being coupled to an end of the second portion opposite the first portion and tapering outwardly away from the central axis and upwardly toward the flange portion.

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13. The resilient clip of Claim 12, wherein each of the flanges further includes a fastener aperture formed into the first, second and third portions, the fastener aperture being configured to provide clearance for the fastener.

14. The resilient clip of Claim 12, the insertion portion has a pair of tapered sides that taper downwardly and inwardly toward the central axis.

15. The resilient clip of Claim 1, further including a spacing structure having first and second flange members, the first flange member being coupled to the flange portion, the second flange member being coupled to an outer edge of the first flange member and tapering downwardly toward the retaining portion and outwardly from the flange portion.

16. The resilient clip of Claim 15, wherein the spacing structure is formed from a resilient material.

17. The resilient clip of Claim 16, wherein the resilient material is plastic.

Sub B4 18. The resilient clip of Claim 15, wherein the spacing structure further includes a coupling member that engages and fixedly couples the flange portion to the spacing structure.

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20. The resilient clip of Claim 15, wherein the first flange member is circular in shape.

21. The resilient clip of Claim 15, wherein the second flange member extends entirely around a perimeter of the first flange member.

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22. ~~The resilient clip of Claim 15, wherein the first flange member includes a recessed cavity sized to receive and locate the flange portion.~~

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23. A resilient clip for engaging a structure, the resilient clip comprising:
a body portion having a pair of flanges, a pair of wing members and a pair
of abutting flanges, each of the wing members having a base portion coupled to
an associated one of the flanges, a first one of the wing members being twisted
5 about a first axis in a first direction, a second one of the wing members being
twisted about a second axis in the first direction, each of the wing members
terminating at a tip portion that is angled downwardly toward the base portion
such that a portion of an associated one of the wing members nearest a central
axis of the body portion extends above an associated portion of the wing member
10 furthest from the central axis of the body portion, the tip portions being configured
to engage a first side of the structure and position a second side of the structure
against the abutting flanges.

Sub E 24. The resilient clip of Claim 23, wherein each of the tip portions has a flat edge for contacting the structure.

25. The resilient clip of Claim 23, wherein each of the tip portions includes an edge with a plurality of teeth, the teeth being operable for contacting the structure.

26. The resilient clip of Claim 23, further comprising a flange portion coupled to the body portion, the flange portion including an aperture having a helical lip, the helical lip adapted to threadably engage a threaded fastener.

27. The resilient clip of Claim 26, further including a spacing structure having first and second flange members, the first flange member being coupled to the flange portion, the second flange member being coupled to an outer edge of the first flange member and tapering downwardly toward and outwardly from the body portion.

28. In combination, a resilient clip for engaging a structure, the resilient clip comprising a body portion for insertion downwardly into a hole formed in the structure, the body portion including a plurality of wing members, each of the wing members having a base portion and terminating at a tip portion that is angled downwardly toward the base portion, each of the tip portions being twisted about an axis such that an inwardly twisted end of the tip portion is positioned above an outwardly twisted end of the tip portion, the plurality of wing members cooperating with the structure to provide the resilient clip with a ratio of insertion force to pull-out force of about 0.04 to about 0.12.

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29. The combination of Claim 28, wherein the ratio of insertion force to pull-out force is about 0.04 to about 0.10.

30. The combination of Claim 28, wherein the resilient clip further comprises a flange portion coupled to the body portion, the flange portion including an aperture having a helical lip, the helical lip adapted to threadably engage a threaded fastener.

31. The combination of Claim 30, wherein the resilient clip further includes a spacing structure having first and second flange members, the first flange member being coupled to the flange portion, the second flange member being coupled to an outer edge of the first flange member and tapering
5 downwardly toward and outwardly from the body portion.

32. The combination of Claim 28, wherein each of the tip portions has a flat edge for contacting the structure.

33. The combination of Claim 28, wherein each of the tip portions includes an edge with a plurality of teeth, the teeth being operable for contacting the structure.

34. A resilient clip for engaging a structure, the resilient clip comprising a body portion for insertion downwardly into a hole formed in the structure, the body portion including a plurality of wing members, each of the wing members including a base portion and terminating at a tip portion that is angled
5 downwardly toward the base portion, each of the tip portions being twisted about an axis such that an inwardly twisted end of the tip portion is positioned above an outwardly twisted end of the tip portion, each of the plurality of wing members terminating at a generally flat and continuous edge for contacting an edge of the
10 hole formed in the structure, wherein the flat edge of each tip portion engages the edge of the hole and inhibits relative movement between the resilient clip and the structure in a direction parallel a longitudinal axis of the hole.

35. The resilient clip of Claim 34, wherein contact between the flat edges and the edges of the hole centers the resilient clip relative to the longitudinal axis of the hole.

36. The resilient clip of Claim 35, further comprising a flange portion coupled to the body portion, the flange portion including an aperture having a helical lip, the helical lip adapted to threadably engage a threaded fastener.

37. The resilient clip of Claim 36, further including a spacing structure having first and second flange members, the first flange member being coupled to the flange portion, the second flange member being coupled to an outer edge of the first flange member and tapering downwardly toward and outwardly from

5 ~~the body portion.~~

38. A resilient clip for engaging a structure, the resilient clip comprising a body portion for insertion downwardly into a hole formed in the first structure, the body portion including a plurality of wing members, each of the wing members terminating at an angled tip portion, each of the tip portions being twisted about an axis such that an inwardly twisted end of the tip portion is positioned above an outwardly twisted end of the tip portion, each of the plurality of wing members including a plurality of teeth for engaging a surface of the structure.

39. The resilient clip of Claim 38, further comprising a flange portion coupled to the body portion, the flange portion including an aperture having a helical edge, the helical edge adapted to threadably engage a threaded fastener.

40. The resilient clip of Claim 39, further including a spacing structure having first and second flange members, the first flange member being coupled to the flange portion, the second flange member being coupled to an outer edge of the first flange member and tapering downwardly toward and outwardly from

5 -the body portion.

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41. A resilient clip for use in securing a first member to a second member, the resilient clip comprising:

a flange portion having an aperture, the aperture adapted to receive a threaded fastener to couple the second member to the flange portion;

5 an insertion portion configured to be inserted into a hole formed into the first member, the insertion portion being coupled to the flange portion; and a retaining portion coupled to the insertion portion and having at least three wing members, each of the wing members being twisted about an associated axis and terminating at a tip portion that is adapted to engage the first member.

42. The resilient clip of Claim 41, wherein the insertion portion is defined by a pair of flanges that are spaced apart about a central axis of the resilient clip, each of the flanges having a first portion and a second portion, the first portion being coupled to the flange portion and tapering inwardly toward the central axis and downwardly from the flange portion, the second portion being
5 coupled to an end of the first portion opposite the flange portion and tapering outwardly away from the central axis and upwardly toward the flange portion.

43. The resilient clip of Claim 42, wherein each of the flanges further includes a fastener aperture formed into the first, second and third portions, the fastener aperture being configured to provide clearance for the fastener.

44. The resilient clip of Claim 42, the insertion portion has a pair of tapered sides that taper downwardly and inwardly toward the central axis.

45. The resilient clip of Claim 41, wherein the retaining portion includes ~~four wing members.~~

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46. A resilient clip for engaging a structure, the resilient clip comprising:
a body portion having a pair of flanges and four wing members, each of
the wing members having a base portion coupled to an associated one of the
flanges, a first one of the wing members coupled to a first one of the flanges and
5 being twisted about a first axis in a first direction, a second one of the wing
members coupled to the first one of the flanges and being twisted about a
second axis in a second direction opposite the first direction, a third one of the
wing members coupled to a second one of the flanges and being twisted about a
third axis in the first direction, a fourth one of the wing members coupled to the
10 second one of the flanges and being twisted about a fourth axis in the second
direction opposite the first direction, each of the wing members terminating at a
tip portion that is angled downwardly toward the base portion such that a portion
of each of the wing members nearest a central axis of the body portion extends
above an associated portion of each of the wing members that is furthest from
15 the central axis of the body portion, the tip portions being configured to engage a
first side of the structure to secure the resilient clip to the structure.

47. The resilient clip of Claim 46, wherein each of the tip portions has an edge with a plurality of teeth for contacting the structure.

48. The resilient clip of Claim 46, wherein the first and third wing members are located cross-corner from one another.

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49. A resilient clip for engaging a first structure to a second structure,
the resilient clip comprising:

a body portion having a pair of flanges and first and second wing
members, each of the wing members having a base portion coupled to an
5 associated one of the flanges, the first wing member being twisted about a first
axis in a first direction, the second wing member being twisted about a second
axis in the first direction, each of the wing members terminating at a tip portion
that is angled downwardly toward the base portion such that a portion of each of
the wing members nearest a central axis of the body portion extends above an
10 associated portion of each of the wing members that is furthest from the central
axis of the body portion, the tip portions being configured to engage a first side of
the structure to secure the resilient clip to the second structure.

50. The resilient clip of Claim 49, further comprising an engagement portion having a plurality of teeth that extend inwardly toward the central axis of the body portion and downwardly toward the base portions of the wing members, the plurality of teeth being configured for engaging the first structure.

51. The resilient clip of Claim 50, wherein the body portion is generally U-shaped.

52. The resilient clip of Claim 50, wherein the teeth are generally ~~triangular in shape.~~

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53. In combination, a resilient clip for coupling a first structure to a second structure, the first structure including a fastening tab, the second structure including a clip aperture, the resilient clip including a body portion and an engagement portion, the body portion having a pair of flanges and first and second wing members, each of the wing members having a base portion coupled to an associated one of the flanges, the first wing member being twisted about a first axis in a first direction, the second wing member being twisted about a second axis in the first direction, each of the wing members terminating at a tip portion that is angled downwardly toward the base portion such that a portion of each of the wing members nearest a central axis of the body portion extends above an associated portion of each of the wing members that is furthest from the central axis of the body portion, the tip portions being configured to engage a first side of the structure to secure the resilient clip to the second structure, the engagement portion having a plurality of teeth that extend inwardly toward the central axis of the body portion and downwardly toward the base portions of the wing members, the plurality of teeth being configured for engaging the first structure.

54. The combination of Claim 53, wherein the fastening tab includes a pair of abutting flanges to inhibit the resilient clip from sliding laterally relative to the fastening tab.

55. The resilient clip of Claim 53, wherein the body portion is generally U-shaped.

56. The resilient clip of Claim 55, wherein the teeth are generally triangular in shape.

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